

a vend space comprising a portion of the space in said vending machine through which said selected product will automatically fall into a bin portion for retrieval by the consumer; and

an optical vend-sensing system configured to sense when said selected product passes through said vend space, said optical vend-sensing system including,

an emitter mechanism configured to generate electromagnetic radiation that substantially spans said vend space, and

a detector mechanism configured to receive said electromagnetic radiation generated by said emitter mechanism and to detect changes in said electromagnetic radiation caused by said selected product passing through said vend space.

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2.
59. (New) The vending machine of claim 58, wherein said dispensing mechanism includes a plurality of helical structures defining regions in which said products are contained.

3.
60. (New) The vending machine of claim 58, further including control circuitry operatively coupled to said detector mechanism and configured to provide a signal indicating that said selected product has passed through said vend space.

4.
61. (New) The vending machine of claim 60, further including a machine control unit communicating with said control circuitry and said dispensing mechanism, said machine control unit configured to control said vending operations of said dispensing mechanism.

5. ~~6~~2. (New) The vending machine of claim ~~6~~1⁴, wherein said control circuitry communicates the operational status of said optical vend-sensing system to said machine control unit.

6. ~~6~~3. (New) The vending machine of claim ~~6~~2⁵, wherein said machine control unit prevents said vending operations when said control circuitry indicates said optical vend-sensing system is incapable of providing said signal indicating that said selected product has passed through said vend space.

B1 7. ~~6~~4. (New) The vending machine of claim ~~6~~1⁴, wherein in response to receiving said signal from said control circuitry indicating that said selected product has passed through said vend space, said machine control unit communicates with said dispensing mechanism to conclude said vending operations.

8. ~~6~~5. (New) The vending machine of claim ~~6~~4⁷, wherein said dispensing mechanism concludes said vending operations before dispensing a subsequent product associated therewith.

14. ~~6~~6. (New) The vending machine of claim ~~6~~8¹ or claim ~~6~~4⁷, wherein said detector mechanism detects changes in said electromagnetic radiation caused by said selected product passing through said vend space by determining that said electromagnetic radiation received by said detector mechanism has been temporarily reduced by a predetermined threshold amount.

15.
67. (New) The vending machine of claim 66, wherein said predetermined threshold amount is determined by taking into account ambient electromagnetic sources.

9.
68. (New) The vending machine of claim 64, wherein said dispensing mechanism advances one or more products in a continuous fashion, in order to dispense said selected product until, in response to said signal from said machine control unit, said dispensing mechanism concludes said vending operations.

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10.
69. (New) The vending machine of claim 68, wherein said dispensing mechanism comprises a helical structure including individual containment regions for said one or more products and wherein rotation of said helical structure advances said selected product in order to dispense said selected product.

11.
70. (New) The vending machine of claim 64, wherein said machine control unit communicates with said dispensing mechanism to conclude said vending operations in response to a predetermined secondary condition when said signal from said control circuitry has not been received by said machine control unit.

12.
71. (New) The vending machine of claim 70, wherein, after said vending operations have been concluded, said machine control unit initiates a corrective action in response to a failure to receive said signal from said control circuitry indicating that said selected product has been dispensed.

13. 12
72. (New) The vending machine of claim 71, wherein said corrective action comprises maintaining a credit established by said customer to allow an alternative selection or to provide a refund.

16.
73. (New) The vending machine of claim 58, wherein said emitter mechanism creates at least one plane of said electromagnetic radiation spanning laterally and depthwise an area at or above an opening of said bin portion but below a lowest said dispensing mechanism such that said selected product entering said bin portion must pass through said plane.

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74. (New) The vending machine of claim 73, wherein said detector mechanism receives substantially all said electromagnetic radiation emitted in a direction defining said plane such that said selected product passing through said plane will diminish said electromagnetic radiation received by said detector mechanism.

18. 3 17
75. (New) The vending machine of claim 60 or claim 74, wherein said control circuitry communicates to said machine control unit that said selected product has passed said optical vend-sensing system when said electromagnetic radiation received by said detector mechanism has been temporarily reduced by a predetermined threshold amount.

19. 18
76. (New) The vending machine of claim 75, wherein said predetermined threshold amount is determined by taking into account ambient electromagnetic radiation.

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71. (New) The vending machine of claim 18, wherein reduction of said electromagnetic radiation received by said detector mechanism as a result of a smallest said selected product is sufficient to exceed said predetermined threshold amount.

21.
78. (New) An optical vend-sensing system configured to sense when a product selected by a consumer is dispensed in a transparent front vending machine, said vending machine having a dispensing mechanism configured to perform vending operations and dispense said selected product into a vend space upon selection by the consumer, said vend space comprising a portion of space in said vending machine through which said selected product will automatically fall into a bin portion for retrieval by the consumer, said optical vend-sensing system comprising:

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an emitter mechanism configured to generate electromagnetic radiation that substantially spans said vend space, and

a detector mechanism configured to receive said electromagnetic radiation generated by said emitter mechanism and to detect changes in said electromagnetic radiation caused by said selected product as it passes through said vend space.

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79. (New) The optical vend-sensing system of claim 21, wherein said dispensing mechanism includes a plurality of helical structures defining regions in which said products are contained.

23.
80. (New) The optical vend-sensing system of claim 21, further including control circuitry operatively coupled to said detector mechanism and configured to provide a signal indicating that said selected product has passed through said vend space.

24. 23.
81. (New) The optical vend-sensing system of claim 80, further including a machine control unit communicating with said control circuitry and said dispensing mechanism, said machine control unit configured to control the vending operations of said dispensing mechanism.

25. 24.
82. (New) The optical vend-sensing system of claim 81, wherein said control circuitry communicates the operational status of said optical vend-sensing system to said machine control unit.

31. 26. 25.
83. (New) The optical vend-sensing system of claim 82, wherein said machine control unit prevents said vending operations when said control circuitry indicates said optical vend-sensing system is incapable of providing said signal indicating that said selected product has passed through said vend space.

27. 24.
84. (New) The optical vend-sensing system of claim 81, wherein in response to receiving said signal from said control circuitry indicating that said selected product has passed through said vend space, said machine control unit communicates with said dispensing mechanism to conclude said vending operations.

28. 27.
85. (New) The optical vend-sensing system of claim 84, wherein said dispensing mechanism concludes said vending operations before dispensing a subsequent product associated therewith.

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34.
86. (New) The optical vend-sensing system of claim ~~78~~²¹ or claim ~~84~~²⁷, wherein said detector mechanism detects changes in said electromagnetic radiation caused by said selected product passing through said vend space by determining that said electromagnetic radiation received by said detector mechanism has been temporarily reduced by a predetermined threshold amount.

35.
87. (New) The optical vend-sensing system of claim ~~86~~³⁴, wherein said predetermined threshold amount is determined by taking into account ambient electromagnetic sources.

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29.
88. (New) The optical vend-sensing system of claim ~~84~~²⁷, wherein said dispensing mechanism advances one or more products in a continuous fashion, in order to dispense said selected product until, in response to said signal from said machine control unit, said dispensing mechanism concludes said vending operations.

30.
89. (New) The optical vend-sensing system of claim ~~86~~²⁹, wherein said dispensing mechanism comprises a helical structure including individual containment regions for said one or more products and wherein rotation of said helical structure advances said selected product in order to dispense said selected product.

31.
90. (New) The optical vend-sensing system of claim ~~84~~²⁷, wherein said machine control unit communicates with said dispensing mechanism to conclude said vending operations in response to a predetermined secondary condition when said signal from said control circuitry has not been received by said machine control unit.

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91. (New) The optical vend-sensing system of claim 31, wherein, after vending operations have been concluded, said machine control unit initiates a corrective action in response to a failure to receive said signal from said control circuitry indicating that said selected product has been dispensed.

33.
92. (New) The optical vend-sensing system of claim 32, wherein said corrective action comprises maintaining a credit established by said customer to allow an alternate selection or to provide a refund.

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36.
93. (New) The optical vend-sensing system of claim 21, wherein said emitter mechanism creates at least one plane of said electromagnetic radiation spanning laterally and depthwise an area at or above an opening of said bin portion but below a lowest said dispensing mechanism such that said selected product entering said bin portion must pass through said plane.

37.
94. (New) The optical vend-sensing system of claim 36, wherein said detector mechanism receives substantially all said electromagnetic radiation emitted in a direction defining said plane such that said selected product passing through said plane will diminish said electromagnetic radiation received by said detector mechanism.

38.
95. (New) The optical vend-sensing system of claim 23 or claim 37, wherein said control circuitry communicates to said machine control unit that said selected product has passed said optical vend-sensing system when said electromagnetic radiation received

by said detector mechanism has been temporarily reduced by a predetermined threshold amount.

^{39.}
^{96.} (New) The optical vend-sensing system of claim ³⁸₉₆, wherein said predetermined threshold amount is determined by taking into account ambient electromagnetic radiation.

^{46.}
^{97.} (New) The optical vend-sensing system of claim ³⁸₉₆, wherein reduction of said electromagnetic radiation received by said detector mechanism as a result of a smallest said selected product is sufficient to exceed said predetermined threshold amount.

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98. (New) A vending machine, comprising:

- a transparent front portion allowing display of products to be vended; a dispensing mechanism configured to dispense a product selected by a consumer;
- a vend space comprising a portion of the space in said vending machine through which said selected product will automatically fall into a bin portion for retrieval by the consumer;
- an optical vend-sensing system configured to sense when said selected product passes through said vend space; and
- a control mechanism configured to control said dispensing as a function of when said optical vend-sensing system senses said product passing through said vend space.

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99. (New) The vending machine of claim 98, wherein said dispensing mechanism includes a dispensing member configured to move in a dispensing direction and to release said selected product.

43. 42
100. (New) The vending machine of claim 99, wherein said control mechanism terminates movement of said dispensing member in response to said optical vend-sensing system sensing when said selected product passes through said vend space.

45. 42
101. (New) The vending machine of claim 99, wherein said dispensing member comprises a helical structure including product containment regions and wherein rotation of said helical structure moves said selected product in said dispensing direction.

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102. (New) The vending machine of claim 98, wherein said control mechanism prevents said dispensing when said optical vend-sensing system is incapable of sensing when said selected product passes through said vend space.

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103. (New) The vending machine of claim 100, wherein said dispensing mechanism concludes dispensing of said selected product before dispensing a subsequent product associated therewith.

47. 41
104. (New) The vending machine of claim 98, wherein said optical vend-sensing system comprises,

an emitter mechanism configured to generate electromagnetic radiation that substantially spans said vend space, and

a detector mechanism configured to receive said electromagnetic radiation generated by said emitter mechanism and to detect changes in said electromagnetic radiation caused by said selected product passing through said vend space.

48. 105. (New) The vending machine of claim 104, further including control circuitry operatively coupled to said detector mechanism and configured to provide a signal indicating that said selected product has passed through said vend space.

49. 106. (New) The vending machine of claim 104, wherein said detector mechanism detects changes in said electromagnetic radiation caused by said selected product passing through said vend space by determining that said electromagnetic radiation received by said detector mechanism has been temporarily reduced by a predetermined threshold amount.

50. 107. (New) The vending machine of claim 106, wherein said predetermined threshold amount is determined by taking into account ambient electromagnetic sources.

56. 108. (New) The vending machine of claim 98, wherein said control mechanism initiates a corrective action in response to a failure to successfully vend said selected product.

57. 109. (New) The vending machine of claim 108, wherein said corrective action comprises maintaining a credit established by said customer to allow an alternative selection or to provide a refund.

51, 47
110. (New) The vending machine of claim 104, wherein said emitter mechanism creates at least one plane of said electromagnetic radiation spanning laterally and depthwise an area at or above an opening of said bin portion but below a lowest said dispensing mechanism such that said selected product entering said bin portion must pass through said plane.

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111. (New) The vending machine of claim 110, wherein said detector mechanism receives substantially all said electromagnetic radiation emitted in a direction defining said plane such that said selected product passing through said plane will diminish said electromagnetic radiation received by said detector mechanism.

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53. 52
112. (New) The vending machine of claim 111, wherein said detector mechanism communicates to said control mechanism that said selected product has passed said optical vend-sensing system when said electromagnetic radiation received by said detector mechanism has been temporarily reduced by a predetermined threshold amount.

54. 53
113. (New) The vending machine of claim 112, wherein said predetermined threshold amount is determined by taking into account ambient electromagnetic radiation.

55. 53
114. (New) The vending machine of claim 112, wherein reduction of said electromagnetic radiation received by said detector mechanism as a result of a smallest said selected product is sufficient to exceed said predetermined threshold amount.

58,

11/5. (New) An optical vend-sensing system configured to sense when a product selected by a consumer is dispensed in a transparent front vending machine, said vending machine having a dispensing mechanism configured to dispense said selected product into a vend space upon selection by the consumer, said vend space comprising a portion of space in said vending machine through which said selected product will automatically fall into a bin portion for retrieval by the consumer, said optical vend-sensing system comprising:

an emitter mechanism configured to generate electromagnetic radiation that substantially spans said vend space;

B1 a detector mechanism configured to receive said electromagnetic radiation generated by said emitter mechanism and to detect changes in said electromagnetic radiation caused by said selected product passing through said vend space; and

a control mechanism configured to control said dispensing as a function of when said optical vend-sensing system senses said product passing through said vend space.

59.

11/6. (New) The optical vend-sensing system of claim 11/5, wherein said dispensing mechanism includes a dispensing member configured to move in a dispensing direction in order to release said selected product.

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60.

11/7. (New) The optical vend-sensing system of claim 11/6, wherein said control mechanism terminates movement of said dispensing member in response to sensing when said selected product passes through said vend space.

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62.
118. (New) The optical vend-sensing system of claim 116, wherein said dispensing member comprises a helical structure including product containment regions and wherein rotation of said helical structure moves said selected product in said dispensing direction.

63.
119. (New) The optical vend-sensing system of claim 115, wherein said control mechanism prevents said dispensing when said optical vend-sensing system is incapable of sensing when said selected product passes through said vend space.

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64.
120. (New) The optical vend-sensing system of claim 117, wherein said dispensing mechanism concludes dispensing of said selected product before dispensing a subsequent product associated therewith.

64.
121. (New) The optical vend-sensing system of claim 115, further including control circuitry operatively coupled to said detector mechanism and configured to provide a signal indicating that said selected product has passed through said vend space.

65.
122. (New) The optical vend-sensing system of claim 115, wherein said detector mechanism detects changes in said electromagnetic radiation caused by said selected product passing through said vend space by determining that said electromagnetic radiation received by said detector mechanism has been temporarily reduced by a predetermined threshold amount.

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66, 65
123. (New) The optical vend-sensing system of claim 122, wherein said predetermined threshold amount is determined by taking into account ambient electromagnetic sources.

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124. (New) The optical vend-sensing system of claim 125, wherein said control mechanism initiates a corrective action in response to a failure to successfully vend said selected product.

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125. (New) The optical vend-sensing system of claim 124, wherein said corrective action comprises maintaining a credit established by said customer to allow an alternative selection or to provide a refund.

69, 58
126. (New) The optical vend-sensing system of claim 125, wherein said emitter mechanism creates at least one plane of said electromagnetic radiation spanning laterally and depthwise an area at or above an opening of said bin portion but below a lowest said dispensing mechanism such that said selected product entering said bin portion must pass through said plane.

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127. (New) The optical vend-sensing system of claim 126, wherein said detector mechanism receives substantially all said electromagnetic radiation emitted in a direction defining said plane such that said selected product passing through said plane will diminish said electromagnetic radiation received by said detector mechanism.

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^{71.}
~~128.~~ (New) The optical vend-sensing system of claim ~~127~~⁷⁰, wherein said detector mechanism communicates to said control mechanism that said selected product has passed said optical vend-sensing system when said electromagnetic radiation received by said detector mechanism has been temporarily reduced by a predetermined threshold amount.

^{72.}
~~129.~~ (New) The optical vend-sensing system of claim ~~128~~⁷¹, wherein said predetermined threshold amount is determined by taking into account ambient electromagnetic radiation.

^{73.}
~~130.~~ (New) The optical vend-sensing system of claim ~~128~~⁷¹, wherein reduction of said electromagnetic radiation received by said detector mechanism as a result of a smallest said selected product is sufficient to exceed said predetermined threshold amount.

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